Implementing the Dry Forest Strategy: Understory Vegetation

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Key Questions

- How do dry forest restoration (fuel) treatments (thinning and prescribed burning) affect understory vegetation?
  - ...effects on plant cover?
  - ...effects on species richness?
  - ...effects on exotic species cover?
- How can we improve our understanding of fuel and restoration treatment effects on vegetation, fuels, and other ecosystem components through monitoring?

Outline

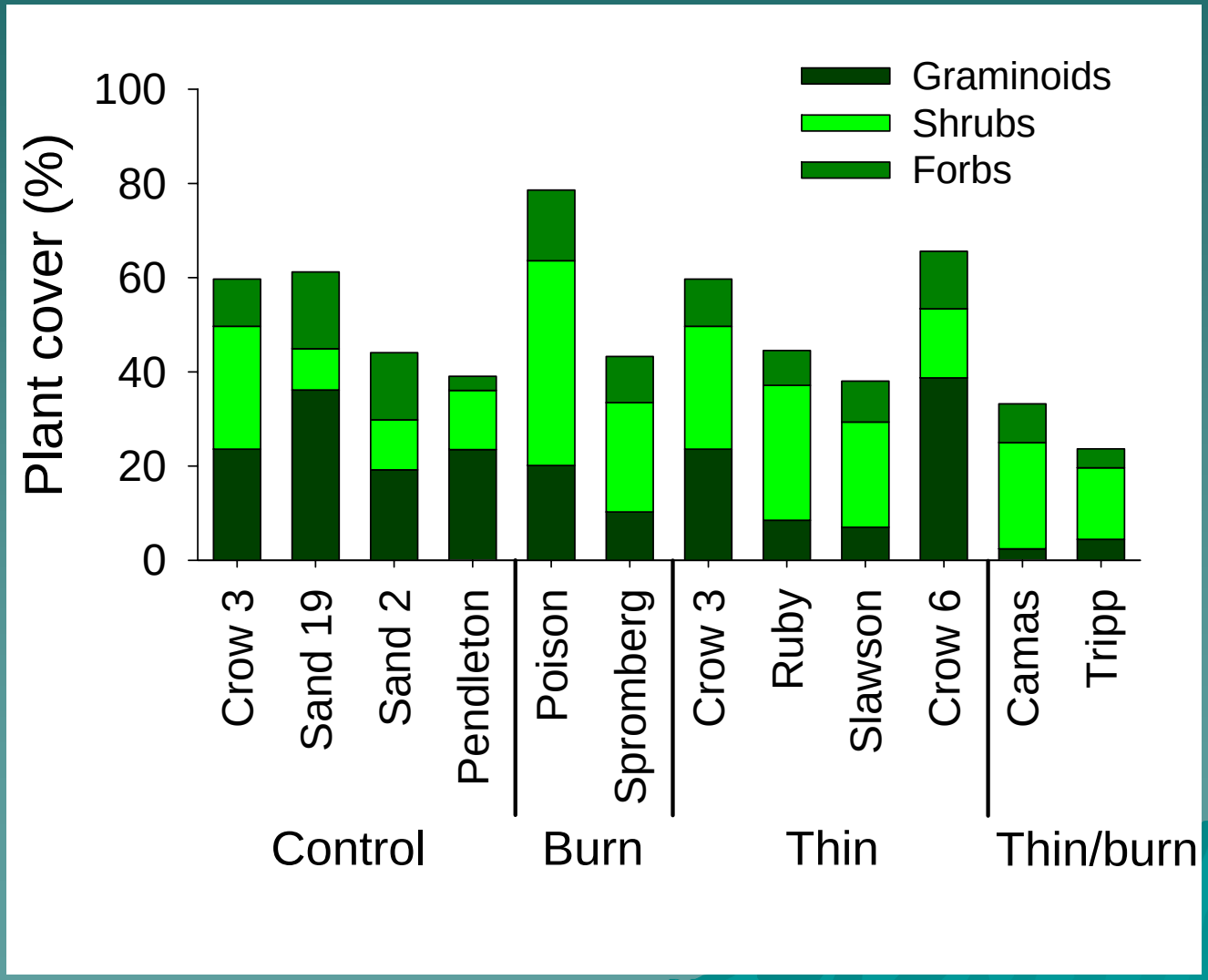
- Fire and Fire Surrogates (FFS) Study
  - Pretreatment vegetation condition
  - Treatment effects on…
    - plant cover
    - species richness
    - exotic species
- Extending FFS through effects monitoring
  - Account for landscape diversity and climate
  - Document outcomes of “real” projects
  - Build up knowledge base over time

Mission Creek FFS
Time Line

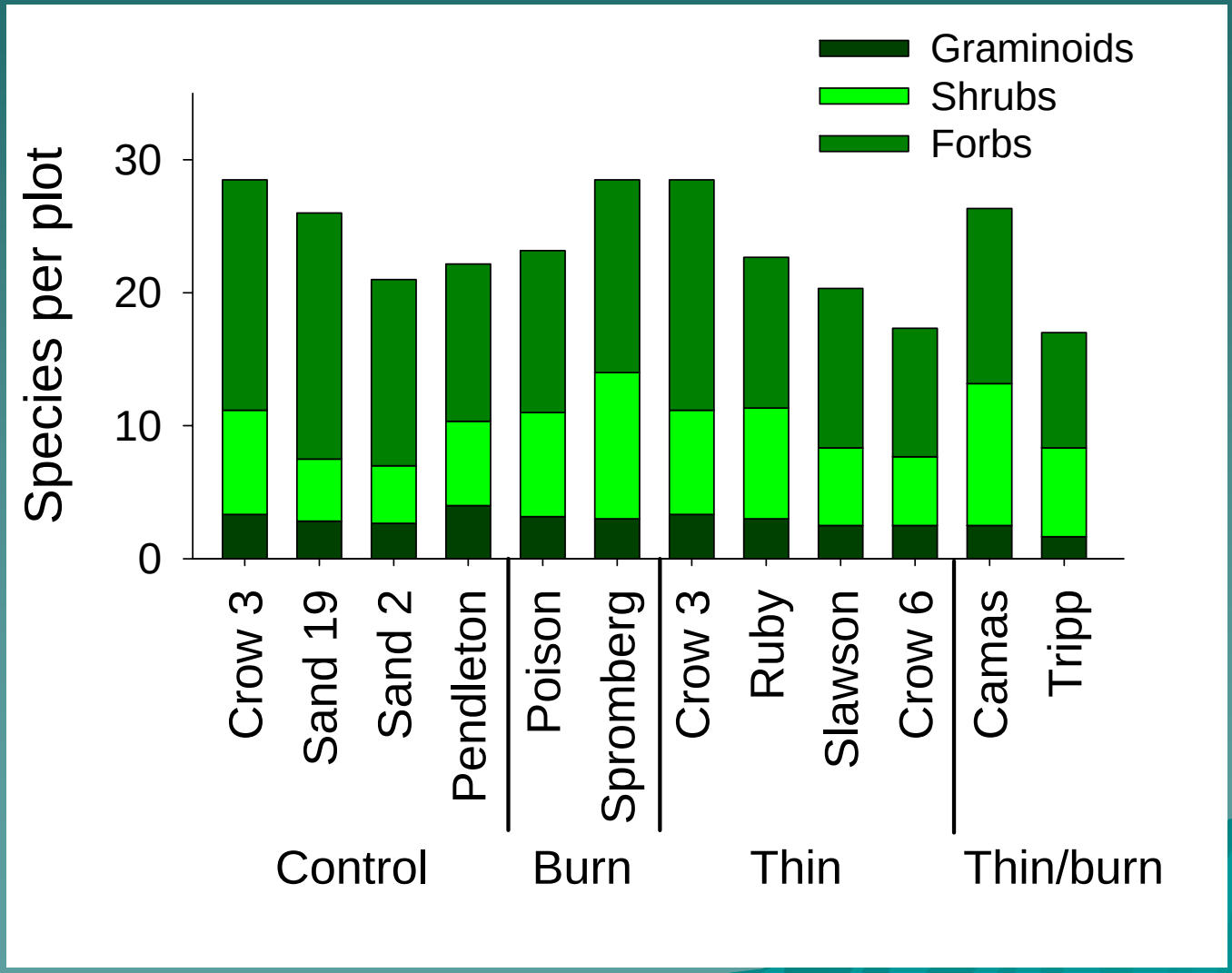
- 2000-2001: Pretreatment surveys
- 2002-2003: Thinning treatments
- Spring 2004: Prescribed fires* (4)
- 2004-2005: Post-treatment surveys
- Spring 2006: Prescribed fires* (2)

* Only four of six scheduled burns were accomplished in 2004

Mission Creek FFS
Variability in plant cover

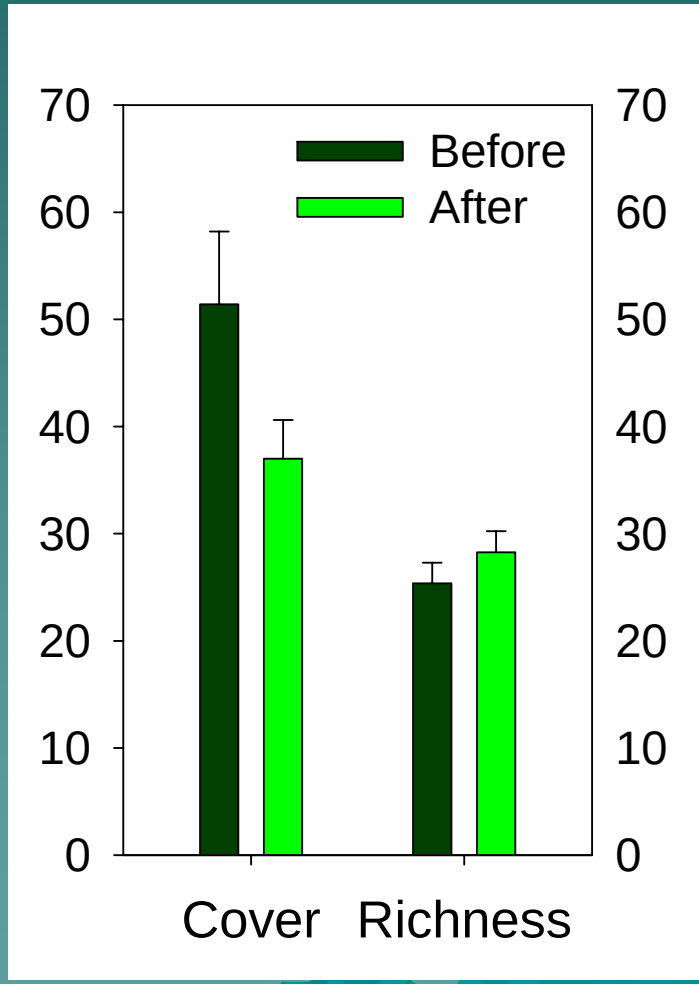


Mission Creek FFS
Variability in species richness



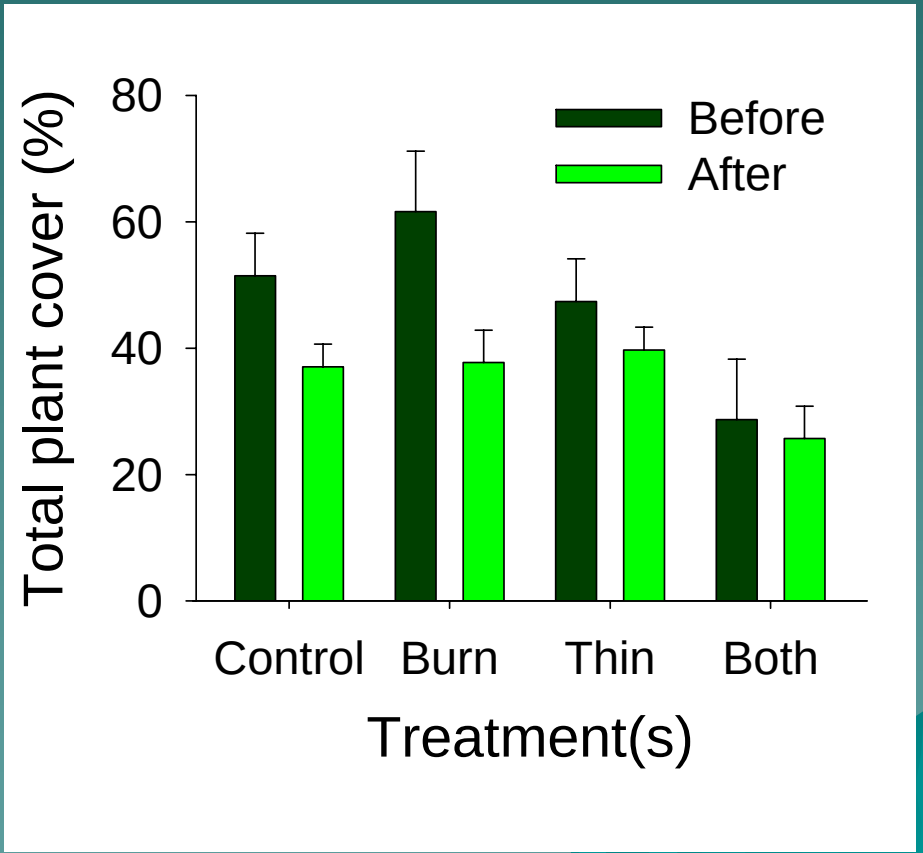
Changes over time on control units 2002-2005

- Cover declined on controls
- Species richness increased on controls
- Normally expect control units to be fairly constant



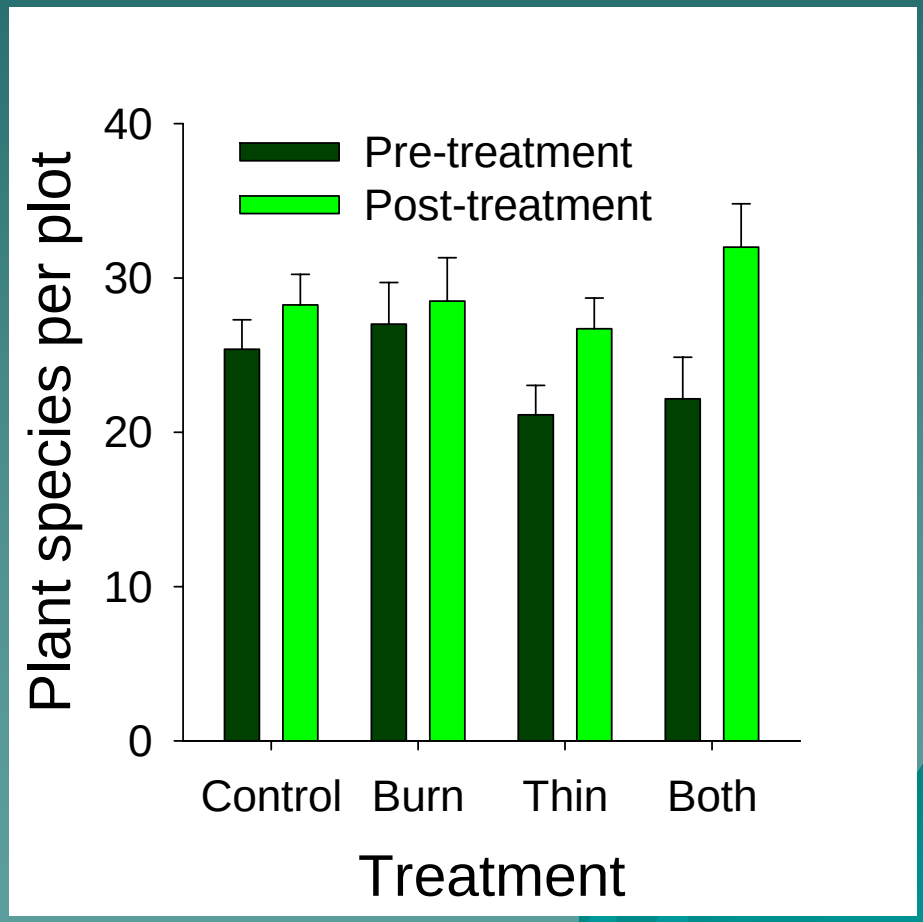
Treatment Effects on Plant Cover

- Plant cover declined less on thinned units.
- Plant cover not affected by burning.
- Without “before” data, “thin+burn” would look like worst treatment

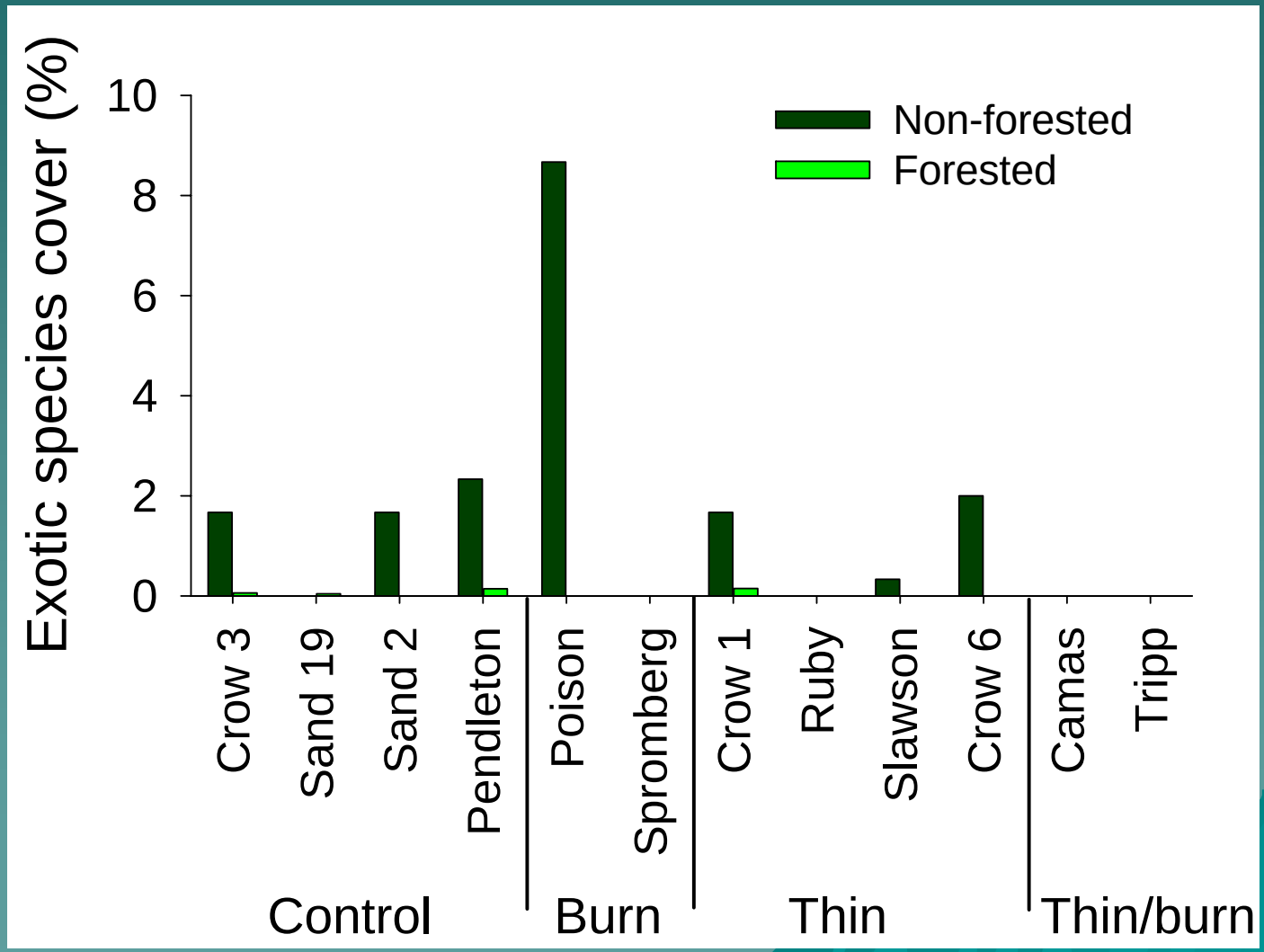


Treatment effects on species richness

- Species richness increased in all treatment groups
- Species richness increased more in thinned units
- Thinning and burning together further increased species richness

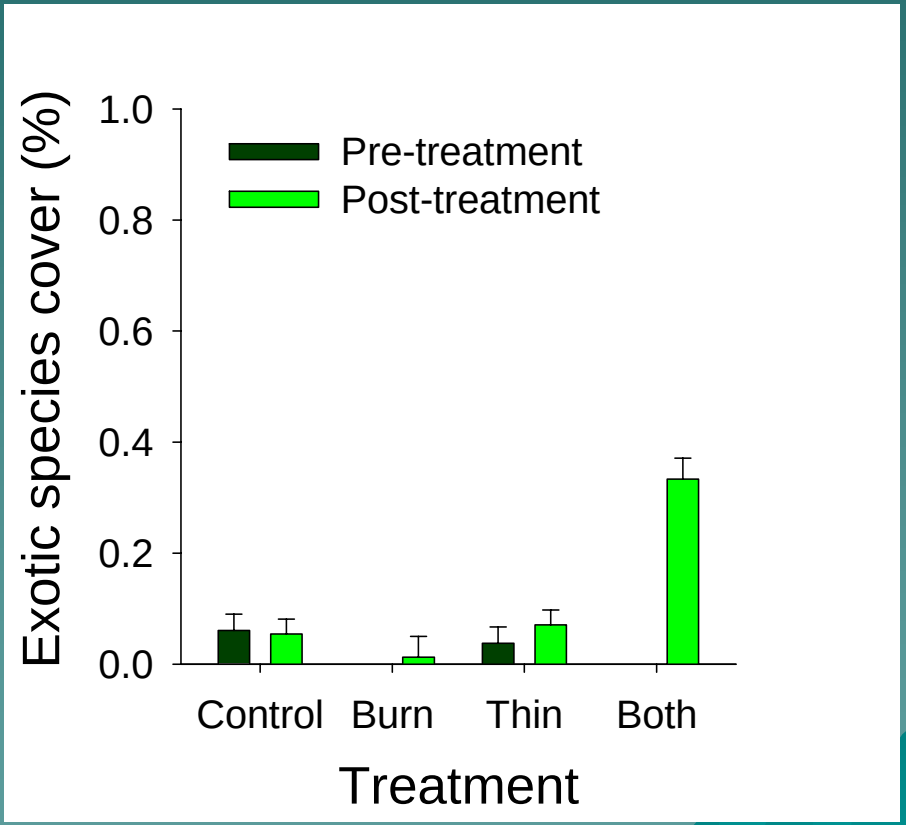


Mission Creek FFS
Variability in exotic species cover



Treatment effects on exotic species

- Exotic species cover and richness increased on units that were both thinned & burned
- Exotic species cover is low on all treatment units (forested areas)



Mission Creek FFS Summary of results

- Understory vegetation cover declined less on thinned sites than on those not thinned
- Species richness increased with thinning, particularly when thinning was followed by prescribed fire
- Forbs were the most responsive to thinning
- Treatments had relatively little effect on overall plant community composition
- Exotic species cover and richness increased in units that were burned following thinning
- Exotic species are not currently a serious problem in forested areas of treatment units

Mission Creek FFS Future directions

- Vegetation surveys in 2007 will update results for units burned in 2006
- All units expected to be surveyed again in 3-5 years to assess long-term treatment effects
- Need to continue to monitor these sites to detect longer-term effects
- Further treatments?

Mission Creek FFS
Study strengths & limitations

- Strengths
  - Comprehensive: ecosystem approach
  - Precision: many detailed observations
  - Scientific: allows hypothesis testing; comparison of alternative treatments
- Limitations
  - Scope: limited to small geographic area, few forest types, and one time period
  - Power: relatively little replication of treatments; low precision of treatment effects
  - Cost: high costs per unit

How might we move forward?

- Adopt an adaptive management approach with scientifically sound effectiveness monitoring
- Develop general and flexible monitoring plans and stick to them as long as they work
- Focus on assessing the effectiveness of current management practices by monitoring results of current and future projects
- Build up knowledge base over time that helps us to make broad statements about treatment effects
- Develop mechanisms for giving rapid feedback of results to practitioners, managers, stakeholders
- Find ways to efficiently use limited funding

How would we do this for fuel reduction treatments?

- Focus on management projects.
  - Scientists or monitoring specialists get involved during project planning period
  - Monitoring plots are installed and surveyed prior to treatment
    - Control areas should be used, but could be treated in subsequent years
  - Treatments are applied
  - Monitoring plots are surveyed again following treatment
  - Results are summarized and returned to local unit; also contribute to regional efforts

How would we do this for fuel reduction treatments?

- Promote communication and cooperation between scientists and managers
  - Scientists need to “get out more,” meet with practitioners, learn more about planning
  - Practitioners need to be convinced that scientists are useful members of a team
  - Accept that monitoring cannot delay or significantly modify management projects!
  - Provide rapid and useful feedback to reinforce the value of monitoring effort and influence future projects

How would we do this for fuel reduction treatments?

- Put less emphasis on formal hypothesis testing
  - $t = 3.14$, $df = 122$, $P < 0.001$
- Put more emphasis on estimating the size and variability of treatment effects within a unit
  - Unit mean = +15% cover,
  - Unit range (95%) = 7-28%